Abstracts

Criteria for wide-band radial switch design

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This paper presents criteria for the design of radial switches, such as can be used in electronically steered circular array antennas for satellite communications mobile terminals. The choice of the switching circuit and diode used in each channel is discussed and the required inductance for the diode shunt capacitance compensation for lower insertion loss is given. Analytical formulas are derived for the general case of an ideal transmission-line switch to show the dependence of the return-loss bandwidth on the choices of the line impedance. Important optimization criteria for lower insertion loss and increased bandwidth are drawn. The criteria have been used to guide the design of economical L-band microstrip switches for use in INMARSAT/MSAT antenna arrays, using low-cost printed-circuits and surface-mount plastic-encapsulated p-i-n diodes. Implementation results for insertion loss, reflection coefficient, and isolation between channels are reported.

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